

CLAIMS

I claim:

1. High-speed centrifugal ventilation device for assisting a patient's respiratory function, of the kind of device comprising a centrifugal ventilator housed inside a casing (3) and primarily composed of at least one wheel (2) rotating at high speed driven by a driver (1) and equipped with a volute (4), channels (11, 12) for circulating a gaseous flux, these channels being arranged inside the casing (3) upstream and downstream of the ventilator, for the induction and discharge of this gaseous flux through the openings of casing (3) for intake (5) and expulsion (6) respectively, characterized by the fact that the volute (4) is integral part of the casing (3) so as to form an integral fixed assembly, while flexible means (7, 8) are intercalated between this fixed assembly (3, 4) and the driver (1) equipped with the wheel (2) which it drives, forming a dynamic assembly (1, 2) to prevent the transmission of vibrations generated by the latter (1, 2) towards the fixed assembly (3, 4).

2. Device as per claim 1 characterized by the fact that the flexible intercalated means between the dynamic assembly (1, 2) and the fixed assembly (3, 4) are at least one of the group of means comprising mechanical springs, flexible materials, magnetic repulsion means.

3. Device as per claim 2 characterized by the fact that at least one flexible element (7, 8) is intercalated between the dynamic assembly (1, 2) and the fixed assembly (3, 4) for their connection to each other, with the dynamic assembly (1, 2) being supported in suspension by the fixed assembly (3, 4).

4. Device as per claim 3 characterized by the fact that the flexible means intercalated between the dynamic assembly (1, 2) and the fixed assembly (3, 4) comprise at least one first flexible element

(7) intercalated between the volute (4) and the dynamic assembly (1, 2), and at least one second flexible element (8) intercalated between the driver (1), at least at its base, and the casing (3).

5. Device as per claim 4 characterized by the fact that the flexible intercalated elements (7, 8) constitute not only connecting means between the fixed assembly (3, 4) and the dynamic assembly (1, 2), but also positioning means for the latter (1, 2) inside the casing (3).

6. Device as per claim 4 characterized by the fact that the flexible intercalated elements (7, 8) are made of elastomer material, their characteristics of hardness, volume and conformation providing them with resonance frequencies in the range of 10 Hz to 300 Hz.

7. Device as per any of the preceding claims characterized by the fact that the circulation channels (11, 12) for gaseous flow inside the casing (3) are lined with a mass (13, 14) of sound-absorbing material.

8. Device as per any of the preceding claims characterized by the fact that at least one of the circulation channels (11, 12) for gaseous flow arranged inside the casing (3) upstream and downstream of the volute (4) is arranged around the driver (1) for the purpose of cooling it through the passage of the gaseous flow in its proximity.

9. Device as per any of the preceding claims characterized by the fact that at least one of the circulation channels (11, 12) for gaseous flow arranged inside the casing (3) upstream and downstream of the volute (4) is organized in the form of a baffle.

10. Device as per any of the preceding claims characterized by the fact that at least one of the circulation channels (11, 12) for gaseous flow upstream and downstream of the volute (4) is arranged inside the casing (3) by partitioning the latter, the partitions (9, 10) being recessed and attached in its

inside space through the intermediary of an impervious material, forming a seal (15) against the passage of the acoustic waves.

11. Device as per any of the preceding claims characterized by the fact that the material the wheel (2) is made of is a light material so as to provide it with low inertia in rotation.

12. Device as per any of the preceding claims characterized by the fact that the wheel (2) is equipped with a flange (16) made of rigid low density foam, attached to the wheel by glueing.

13. Device as per any of the preceding claims characterized by the fact that the driver (1) is equipped with sensors for detecting the angular position of the rotor.

14. Device as per any of the claims 1 to 12, characterized by the fact that the driver (1) being a synchronous motor with permanent magnets at the rotor, without position sensors, its operation is put under the dependence of electronic means with vectorial control of the flow.

15. Device as per any of the preceding claims characterized by the fact that it includes two intakes (17, 18) of gaseous flux circulation that are arranged in proximity of the evacuation orifice (6) of the casing (3), one of these intakes being intended to measure the fluid pressure at the output of the casing (3), the other intake in turn being intended to permit the injection of oxygen to enrich the gaseous mixture which is delivered to the patient.

16. Device as per claim 1 and any of the preceding claims characterized by the fact that each wheel (2) is equipped with a volute (4).

17. Device as per claim 1 and any of the claims 2 to 15 characterized by the fact that a single volute (4) covers several wheels.